

# **Microsoft® Tablet PC Overview**

**Alex Loeb**

**General Manager**

**Tablet PC**

**Microsoft Corporation**

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# What Is The MS Tablet PC?

- **A fully functional PC**
  - **Supersets capabilities of the laptop**
- **Runs Windows XP Pro 'plus'**
  - **The ability to drive Windows with a pen**
  - **Supports all legacy Windows applications**
- **Enables powerful new Windows applications**
  - **Editing and note taking, especially in meetings**
  - **Cut and paste, insert, edit, format, attach to e-mail**
  - **Search handwritten notes for keywords**
  - **Improved ink mark-up, "Ink as ink"**
  - **The best reader available**

*Tablet PC is an evolution of the laptop*



# Why A Tablet PC?

Go where no PC has gone before

- **Meetings**
  - Laptops sub-optimal; can be distracting and rude
  - Can't easily capture all information
- **Reading**
  - Electronic books
  - Read immersively and actively
- **Working away from a desk**

*Tablet PC extends PC usage*



# How Do We Get There?

- **More adaptable, ergonomic form factor**
  - Slate-like device, similar to a pad of paper
  - Light, great screen, holds well
- **Expand input mechanisms**
  - Voice, pen, navigation buttons, keyboard or mouse
  - There will be “convertible” Tablets with keyboards
- **Great software**
  - Full legacy Windows® application support
  - System level enhancements
  - Applications for key scenarios

*Combine simplicity of paper with power of a PC*

# Why Now?

- **Technology improvements**
  - Low power, high performance CPUs
  - Large, fast, low-power memory
  - Low power LCDs
  - Efficient batteries
  - Wireless network infrastructure
  - ClearType
  - Advances in handwriting and speech recognition
  - New UI for Pen input and easy navigation

***The technology is finally ready!***

# Who Will Use It?

- **All PC owners, eventually**
  - Tablet are the evolution of the laptop
  - Active pen will become as ubiquitous as the mouse
- **Low hanging fruit: corporate workers**
  - Spend significant time away from desk
  - In formal or informal meetings
  - Accessing local files and applications
  - Wirelessly accessing e-mail, network resources
- **OEM and ISV support will enhance and expand focus**

*Tablet PC is great for business*



# Tablet PC Team Deliverables

- **Hardware support**
  - Prototypes for proof of concept
  - OEM Support
- **System components**
  - Windows XP enhancements
  - Speech and handwriting TIP
- **Notebook Application**
- **Platform Components**
  - Platform SDK, APIs, design guidelines

# Hardware Support

- Prototypes
  - Proof of concept
  - Partner excitement
  - User interaction testing
- OEM support
  - Traditional OAK, etc
  - Design form factor testing and feedback

# Hardware challenges

- Microphone, signal processing
- Screen readability
- Pen & digitizer technologies
- Form factor ergonomics
- More...



# System Components

- All platform work for Pen, Ink, Speech
- System optimization - display, form factor, etc.
- Natural Input UI (TIP), combination of speech, handwriting, soft keyboard
- Handwriting/language recognition
  - US English, International English, Japanese, German, French (V1)
  - Simplified and Traditional Chinese, Korean
  - Future – Spanish, Italian

# System Challenges

- Network connectivity
- Hot docking and undocking
- Parallax, tolerance
- Portrait orientation UI issues
- More...

# Notebook Application

## Objectives

- Delight customers in key scenarios
  - Taking notes with a pen
  - Using Windows/PC in meeting
  - Reading and marking up documents

*The simplicity of paper &  
the power of the PC*

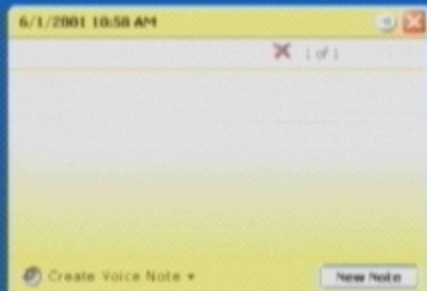


# Notebook Application

- **Key needed functionality**
  - Replacement for pen and paper
  - Markup electronic print out from any app
- **Showcase application for ISVs**
  - Paper-like, pen-centric UI optimized for note taking
- **Consumer of our ISV deliverables**
  - High quality ink rendering, parsing and manipulation
- **Other Applications**
  - MODI/Epaper
  - Sticky notes
  - MS Reader, etc.

# Applications challenges

- Interface for Connected Components
- Picture Extraction
- Extracting Vector Graphics
- Layout Analysis
- Ink rendering and display
- More...





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(Junkai)

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By THOM CHANDLER

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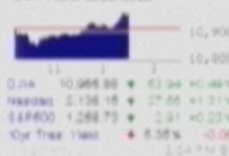
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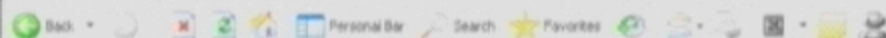


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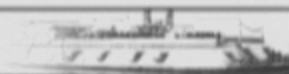
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June 1, 2001

## Missile Defenses Need More Tests, Key Senator Says

By THOM SHANKER

**W**ASHINGTON, May 31 — The next chairman of the Senate Armed Services Committee said today that it was highly unlikely that missile defenses would be fielded in President Bush's current term, and should not be deployed at all until repeated tests proved their effectiveness.

The senator, Carl Levin, Democrat of Michigan, said he was confident that the nation had both the treasury and technology for missile defenses. But he predicted that diplomatic barriers over the Anti-Ballistic Missile Treaty and the scientific hurdles meant "the odds are against" deployment by

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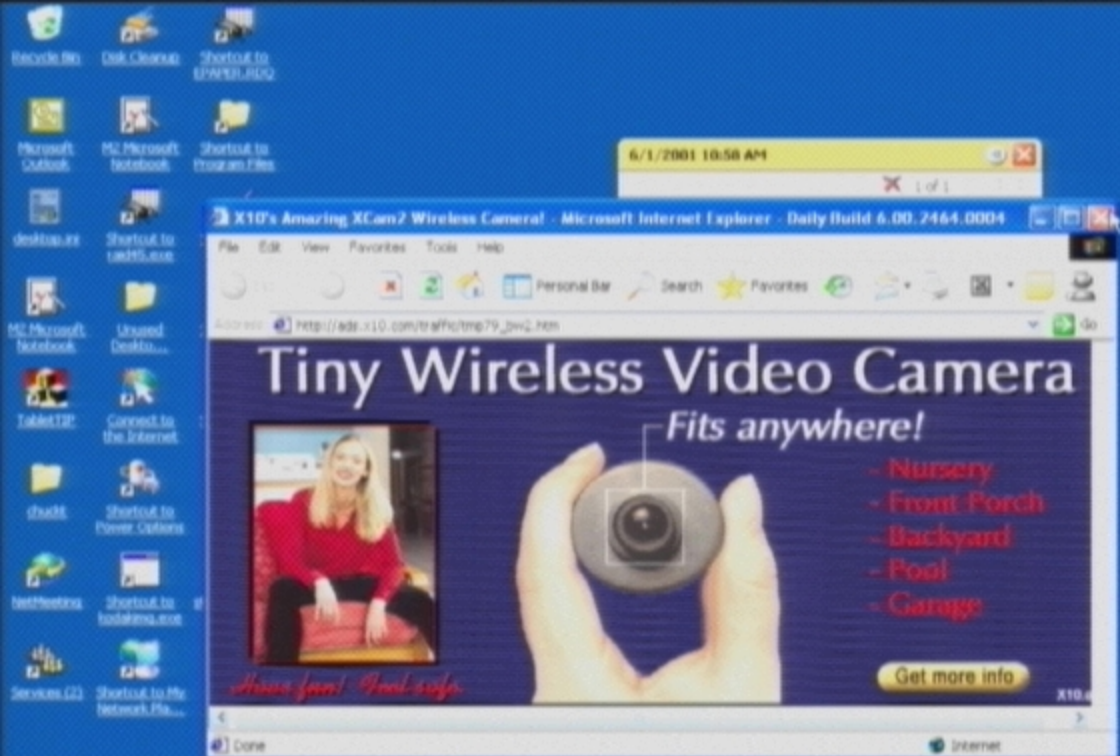
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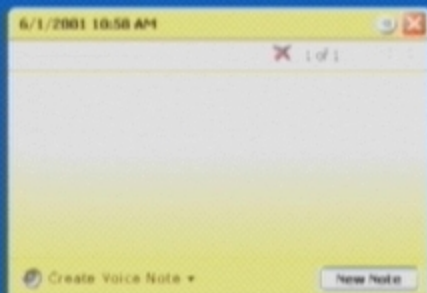
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Calendar	Alex Loeb	RE: FW: Business Planning Review w/ Dick Brass	4 KB	Fri 6/1/2001 10:11 AM
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Contacts	Alex Loeb	RE: Proposed cut to V1 UA: tablet print materia...	10 KB	Fri 6/1/2001 9:50 AM
Deleted Items (1318)	Alex Loeb	RE: Tablet/Windows alignment	9 KB	Fri 6/1/2001 9:54 AM
Drafts (1)	Alex Loeb	headcount number	5 KB	Thu 5/31/2001 12:38 PM
Epaper	Alex Loeb	Tablet/Windows Status	5 KB	Thu 5/31/2001 11:45 AM
General (2)	Alex Loeb	FW: Tablet/Windows alignment	6 KB	Thu 5/31/2001 11:29 AM
Inbox (68)	Alex Loeb	RE: Usability of the Tablet	5 KB	Thu 5/31/2001 11:27 AM
Journal	Alex Loeb	Usability of the Tablet	8 KB	Thu 5/31/2001 11:21 AM
Management	Alex Loeb	RE: gold star	10 KB	Wed 5/30/2001 2:09 PM
Me (1)	Alex Loeb	Tablet headcount	4 KB	Tue 5/29/2001 2:03 PM
Move	Alex Loeb	MSR Tablet review	3 KB	Mon 5/28/2001 1:22 PM
Notes	Alex Loeb	RE: Downplaying Reco	8 KB	Mon 5/28/2001 12:44 PM
Other Products	Alex Loeb	Training	3 KB	Mon 5/28/2001 12:19 PM
Outbox	Alex Loeb	gold star	4 KB	Mon 5/28/2001 12:08 PM
Personal (2)	Alex Loeb	RE: Speech Review	7 KB	Mon 5/28/2001 11:00 AM
Sent Items	Alex Loeb	FW: Virtual paper	3 KB	Thu 5/24/2001 1:25 PM
Tablet Notes	Alex Loeb	BT: Tablet headcount	10 KB	Thu 5/24/2001 1:24 PM
TabletPC Other (2)	Alex Loeb			
Tasks				

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<b>Subject:</b> TELUtoRiz Dev/Mgmt Headcount close-out	<b>From:</b> Sheena Perree on behalf of Alex Loeb
<b>When:</b> Friday, June 01, 2001 2:00 PM-2:30 PM.	<b>Location:</b> Alex's office
<b>When:</b> Friday, June 01, 2001 2:00 PM-2:30 PM (GMT-08:00) Pacific Time (US & Canada); Tijuana, Where: Alex's office	

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To: Bill Gallagher

Cc:

Subject: RE: Ship-it awards

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|

-----Original Message-----

From: Bill Gallagher

Sent: Tuesday, May 29, 2001 9:00 AM

To: Larry Singel

Subject: RE: Ship-it awards

Office:

bliga

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-- wayneft wasn't on it long enough

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From: L

Sent: P

To: Bill

Subject

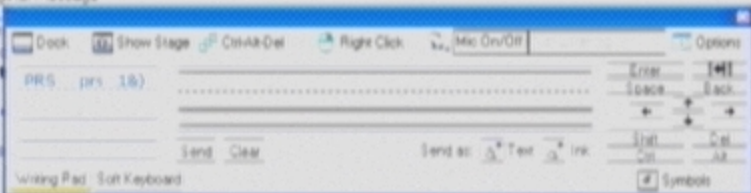
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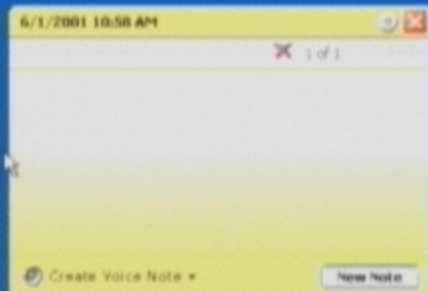
I know

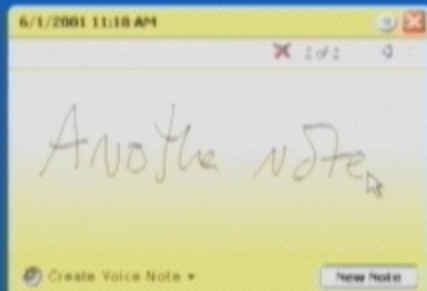
Writing Pad

Soft Keyboard









Demo to MSR 06/01/2001

- 'But can it do math?'
- Can it do geography?
  - Picture Extraction
  - Connected Components
- But can it be snooped?
- Whistler
- Blackcomb



Demo to MSR 06/01/2001

- 'But can it do math.?
- Can it do geography?
- **Picture Extraction**
  - Connected Components
  - But can it be snooped?
- Whistler
- Longhorn
- Blackcomb

Take vdr  
here.

Demo to MSR 06/01/2001

- But can it do math?
- Can it do geography?
- Picture Extraction
- Connected Components
- But can it be snooped?

Take sdr  
here.

- Whistler
- Longhorn
- Blackcombs

## "Think with Ink"

Couple the simplicity of paper with the power of the PC.

1. Take a note - The pen is much handier handwriting!

2. Sketch. It's much more expressive and personal!

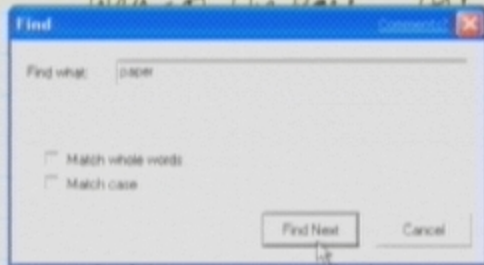
Here's what we had to focus on to support these activities on the Tablet.

Re-make the PC in a form you can pick up with one hand and use with the other: small and light enough to carry to meetings and even pass around.

↳ Then there's the visual quality. Laptop displays give crisp stable images, but you need a portrait orientation to match the page.

You need clear True Fonts to look like print.





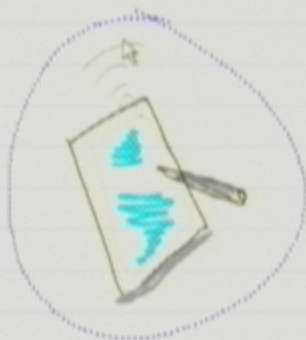
tasks are available in the menu;  
 And handy as icons alongside  
 rectirgualities of paper Active  
 ting flipping back and forth, looking

Software done right can make those tasks even easier than  
 'paper' the Tablet.

Networked Tablets











way of the page. All tasks are available in the menu; some are made extra handy as icons alongside.

Then there are the interactive qualities of paper. Active reading involves highlighting, flipping back and forth, looking things up, etc...

Software done right can make those tasks even easier than paper the Tablet.

Networked Tablets

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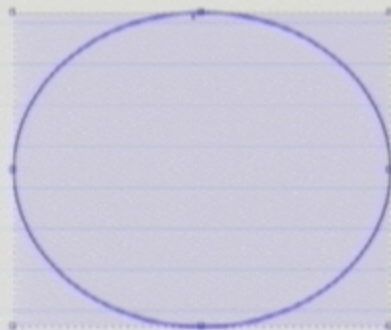


Networked Tablets

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Networked Tablets



# Applications challenges

- Interface for Connected Components
- Picture Extraction
- Extracting Vector Graphics
- Layout Analysis
- Ink rendering and display
- More...

# Platform Components

- **Enable inking and handwriting recognition**
- **Deliver Tablet PC platform SDK**
  - ActiveX controls for inking
  - Addition to Win32 API
  - Enable ISVs to integrate Ink as a first-class data type
  - Provide guidelines for Speech integration
  - Provide user experience guidelines for Tablet applications
- **Promote pen, ink, speech in Microsoft & ISV applications**

**Enables ISVs to pen, ink and speech enable existing and new Windows applications**

# Platform Components

## Software Development Kit (SDK)

- **Contents**

- WISP header and lib files
- SAPI 5.1 SDK
- Tablet PC User Experience guidelines
- Sample code
- Online docs
- Visual Studio 6.0/7.0 project templates
- .NET scenario support and framework integration

- **Delivery**

- MSDN integration (MSDN subscription, [msdn.microsoft.com](http://msdn.microsoft.com))
- Windows XP Pro 'plus' with Wacom tablets for developers
- Certification programs



# Platform challenges

- Recognition
  - Handwriting, gestures, speech, etc
- Interaction between character, ink and speech
  - Recognition
  - User interaction
- More...



# Handwriting Recognition

- Key focus: Experiments that focus on reducing error rate!
- Primary research on Neural Net, HMM, KNN, and CART algorithms
- Hybrid classifiers (classifier fusion) enable us to make significant reduction in error rate.
- Data is King -- work with LARGE amounts of data
  - ex. 16M words in English, 32M Char JPN

# Handwriting Reco cont.

- Recent and ongoing problems
  - Better fusion and core reco techniques
  - Gesture recognition (Bo Thiesson)
  - Enrollment of hybrid classifier
  - Language Models (collaborate with MSKK)
  - Separation of drawings vs. text
  - Reduction of training time
- Contacts: JPittman and GregHull

# Tablet Usability



# Where we've been, what we've done

- Early prototype testing of notebook concepts
- Note taking ethnography
- Annotation ethnography
- Multiple iterative test of the M2 notebook implementation
- Multiple iterative tests of the "TIP"
- Plenty of heuristic evaluations
- Field Trials



# Field Trial Methodology

- 21 user case study approach
- 4 full weeks of hands-on Tablet PC usage
- 6 formal interview/observation sessions
  - Prescreening interview
  - Training & scripted task session
  - Meeting observation
  - Scripted task session
  - Meeting observation
  - Final interview and artifact walk through
- 2+ hours of user interaction per week
- Informal drop in sessions when possible

# Field Trial Conclusions

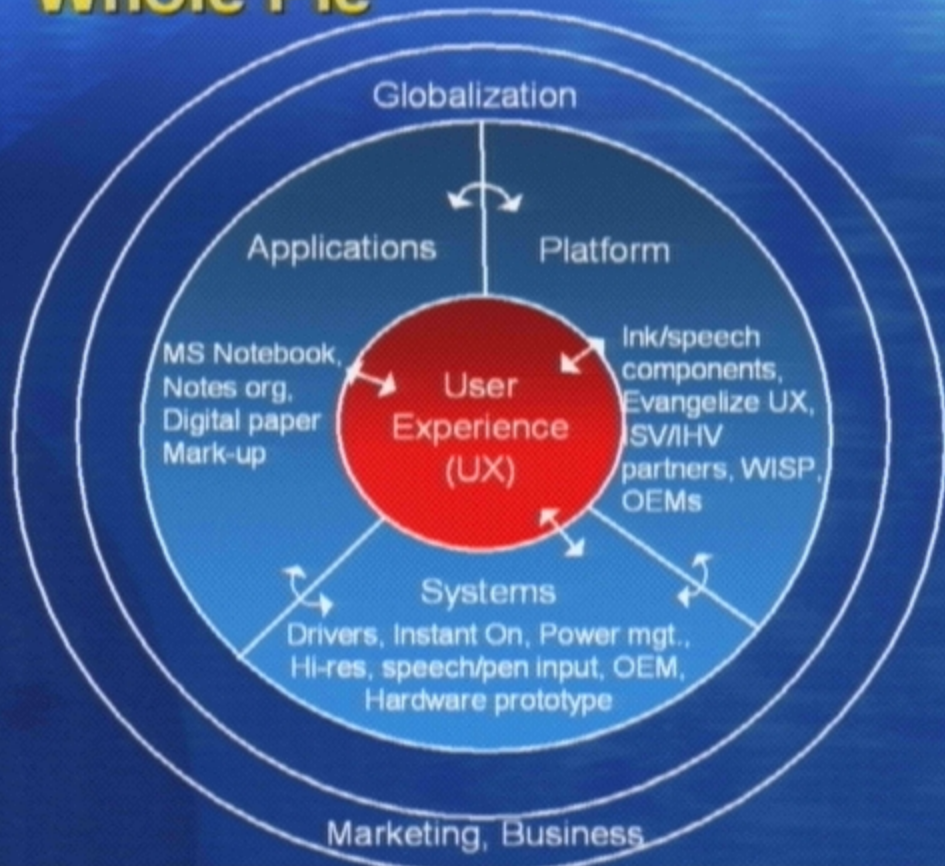
- Too complex and over-engineered
- Writing and editing didn't necessarily co-occur and was not seamless
- Note storage of raw ink seen as valuable
- Situations drive usage more than other PCs
- Docking Station a must
- Network infrastructure play a big role

# Overall Findings

- Intelligent heuristics while powerful confuse and frustrate users when they aren't predictable
- Targeting with a pen can be more difficult than with a mouse.
- Hand occludes objects – menus and controls appear under the user's hand
- Screen is kept in whatever orientation last used
- Users have an initial expectation that they can ink anywhere
- Writing for correction/repurposing is different than jotting down information
- Handwriting recognition is highly variable by person



# The "Whole Pie"





# Very Preliminary Milestones

- **June 2001**
  - Design Preview in Redmond
- **Q4 2001**
  - Beta OAK released
  - Fall Comdex
- **Q1 2002**
  - Release candidate
- **Q2-Q4 2002**
  - Final release – US English

*Localized versions released shortly afterwards*

# Design Preview Event

- **June 11th and 12th in Seattle, WA**
  - Bell Harbor International Conference Center
- **Attendees: All early adopter ISVs, OEM/IHV partners**
  - Total attendance ~100 people
  - All attendees under NDA
- **Two presentation tracks – ISVs, OEMs**
  - Tracks mixed so ISVs and OEMs understand each other
- **ISV Track: Building Applications**
  - Educate ISVs on Microsoft Ink components, user experience guidelines and speech integration
  - Educate ISVs on scope of integration work
  - Recommendations for development and schedule
  - Start working with Tablet SDK Alpha
- **OEM Track: Developing Hardware**

# Early Adopter ISVs

- **Segments**

- Desktop Productivity
- Collaboration
- CRM
- ERP
- Enterprise Applications

- **Proprietary Apps**

- Financial Services
- Management Consulting
- Sports

- **Verticals**

- Healthcare
- Legal
- Corporate Training
- Engineering
- Manufacturing
- Publishing/Journalism

- **System Integrators**